Alpha, Beta, and Now… Gamma

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Morningstar Investment Management

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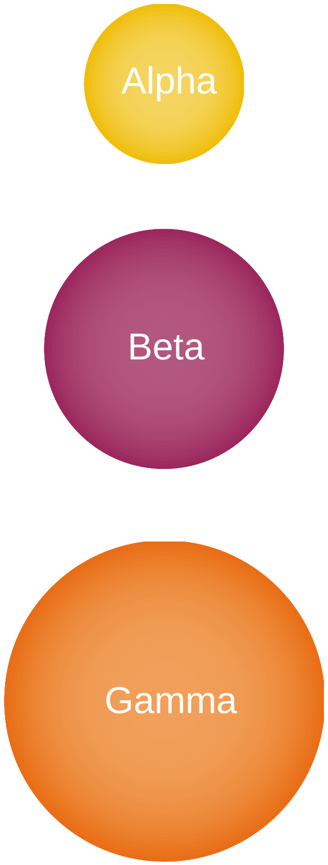

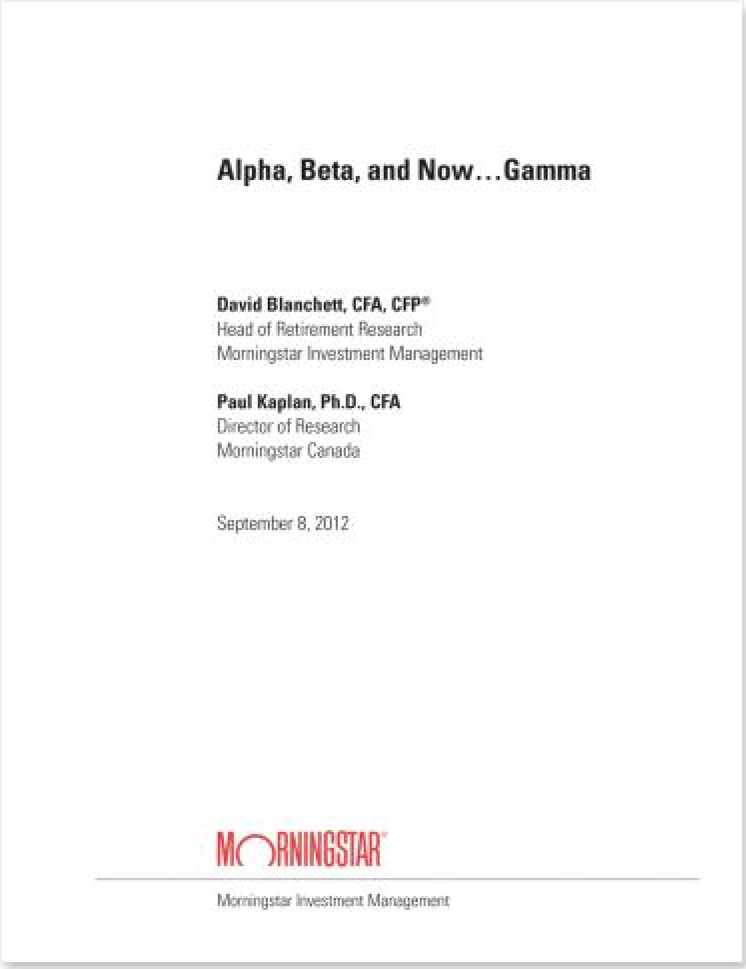

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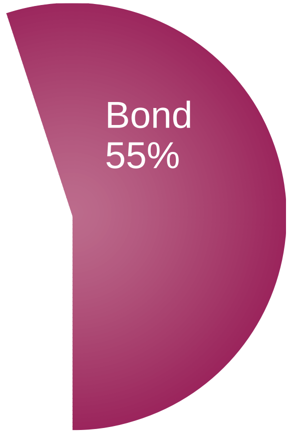
Different Types of Gamma

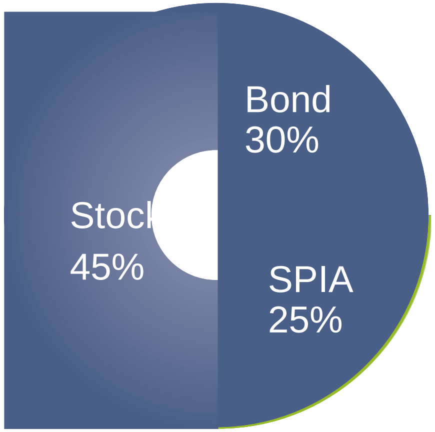
- Total Wealth Asset Allocation
- Dynamic Withdrawal Strategy
- Annuity Allocation
- Asset Location and Withdrawal Sourcing
- Liability Relative Optimization

Total Wealth Allocation

Market Portfolio



Adding Guaranteed Income



The remaining non-annuity portfolio now has a 60% equity allocation; however, the total wealth allocation from an income perspective, after considering the Single Premium Immediate Annuity (SPIA), is still 45% equities

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Dynamic Withdrawal Strategy

Traditional Approach

1. Determine Withdrawal Amount Retirement

   The 4% rule

2. Withdrawal Annually Accounting for Inflation

Our Approach

1. Determine Retirement Period
2. Determine Portfolio Equity Allocation
3. Determine Withdrawal Percentage for a Given Target
4. Repeat Annually

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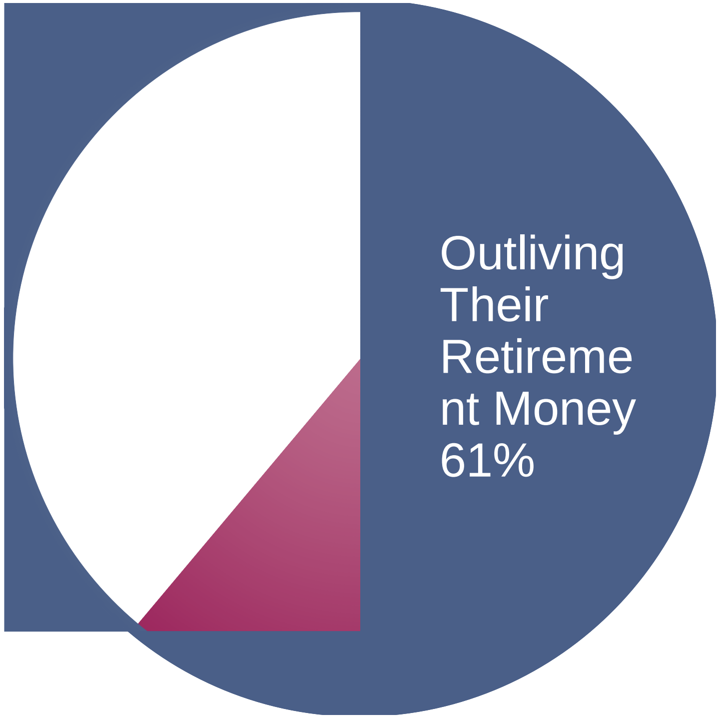
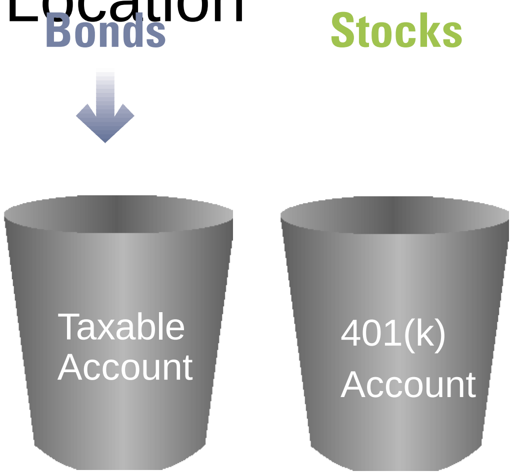
Annuity Allocation: What do Retirees Fear More?



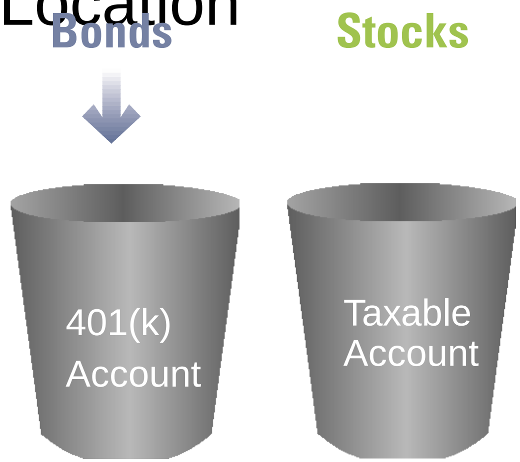
Source: http://www.allianzlife.com/content/public/Literature/Documents/ent-1154.pdf

Asset Allocation and Withdrawal Sourcing

Inefficient Asset Location



Efficient Asset Location



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Liability Relative Optimization

Value of Liabilities vs Value of Assets

Portfolio Health/Funding Costs

Asset-
only
Approac
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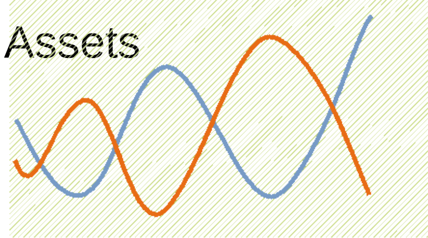
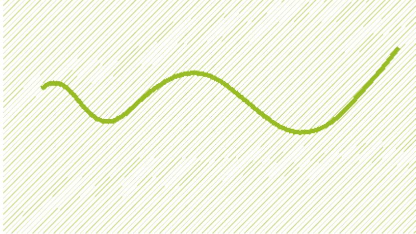


Time



Liability-
relative
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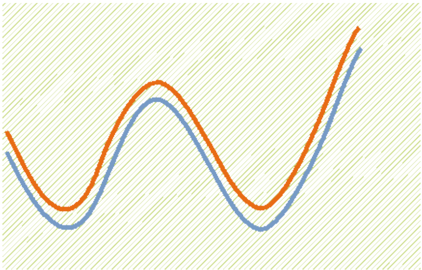

Time

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- Total Wealth Asset Allocation

Individual Portfolio Assignment

Financial Capital

- Tradable assets such as stocks and bonds have traditionally been used when constructing an asset allocation
- Incomplete without considering Human Capital

- An individual’s ability to earn and save
- Present value of all your expected future wages including pension and social securities

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Life Cycle of Human Capital and Financial Capital

Human Capital
An individual's ability to earn and save

Financial Capital
An individual's total saved assets

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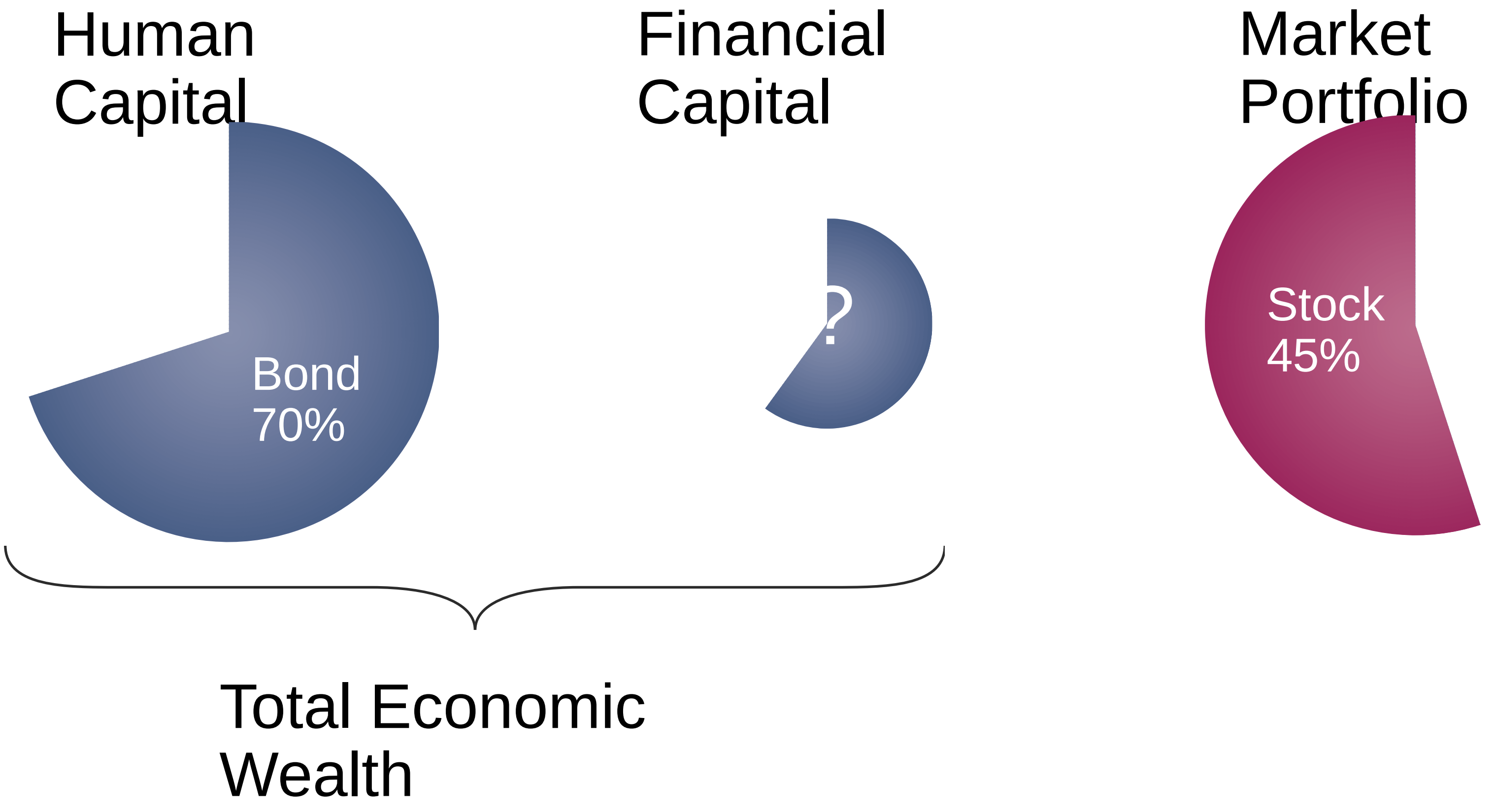
Targeting the Market Portfolio



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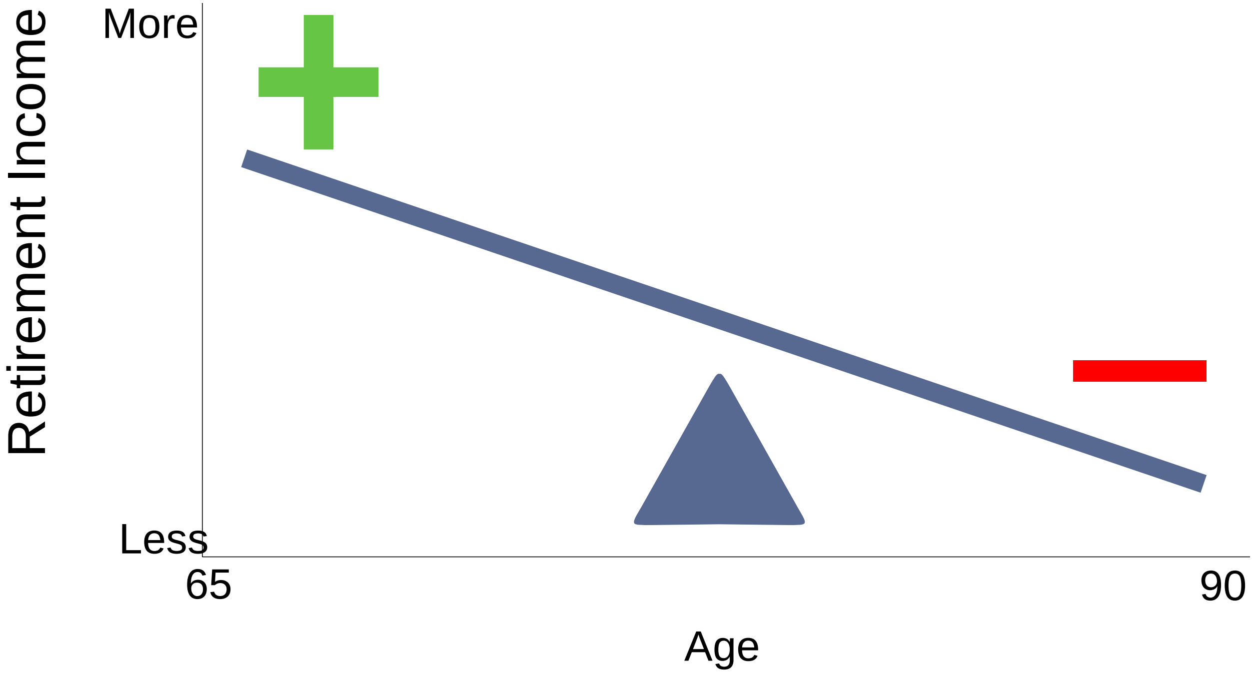
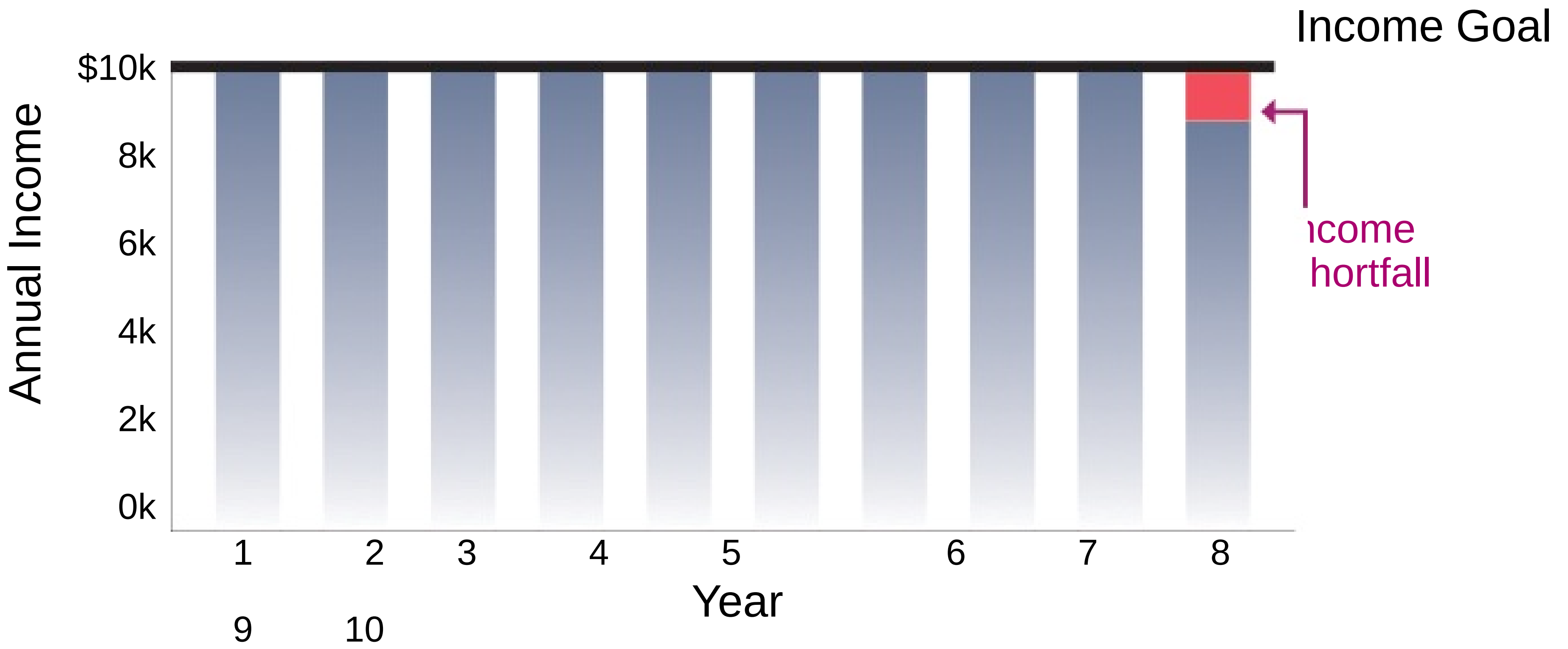
- Dynamic Withdrawal Strategy

A Balancing Act



Defining “Failure“ for a Retiree



- You can achieve 99% of your goal and still “fail”

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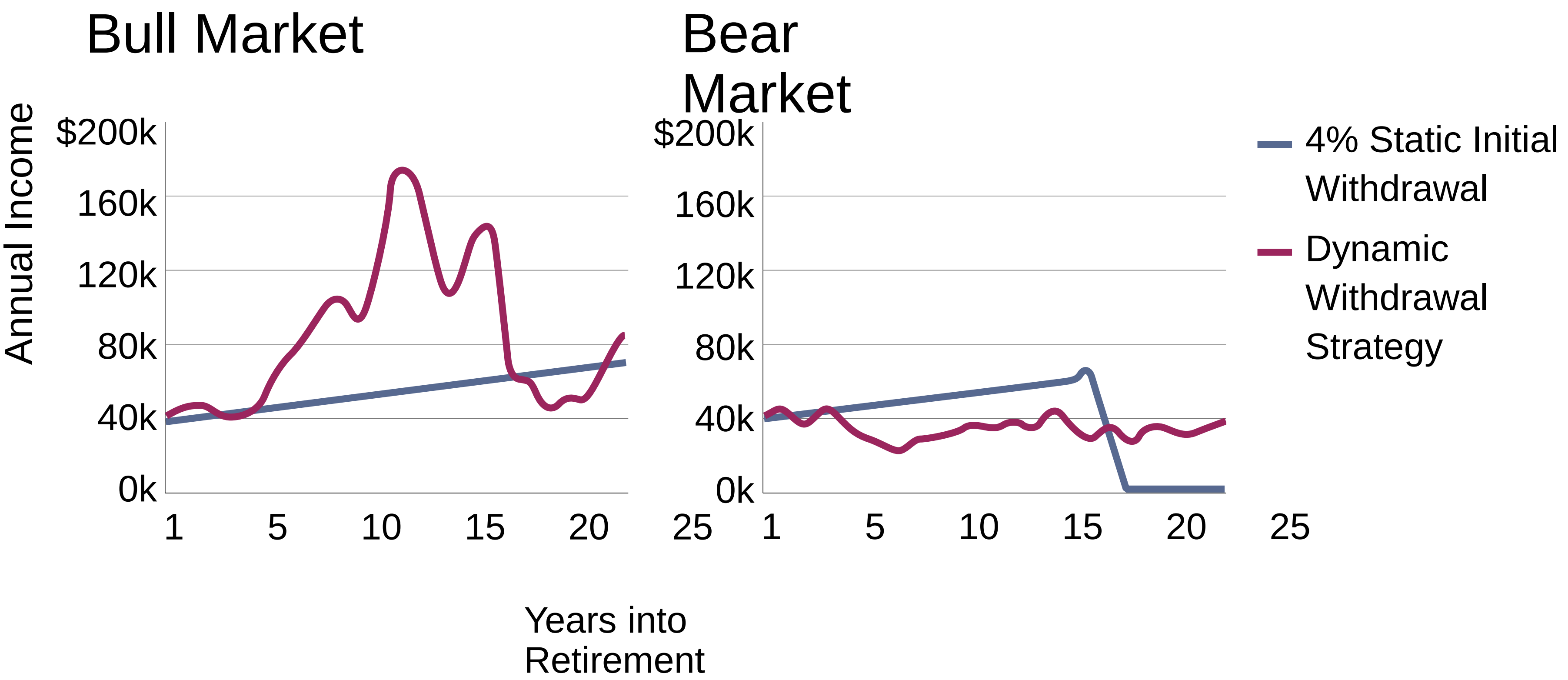
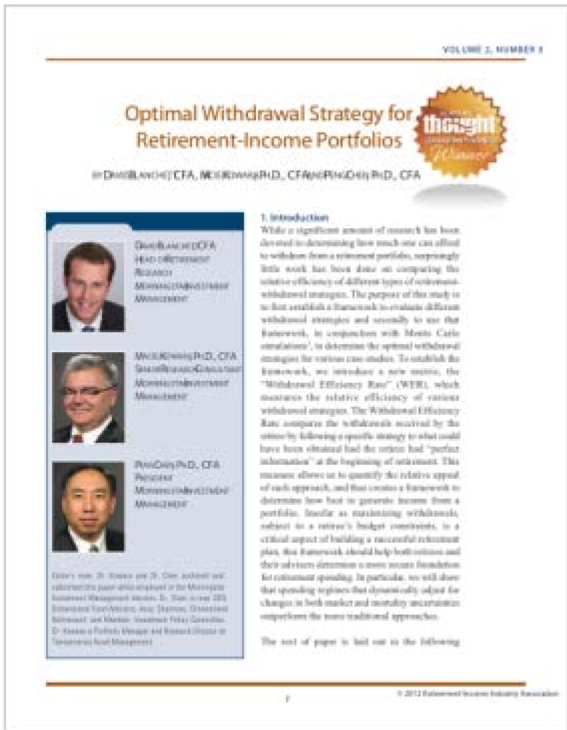
Change Is a Good Thing



Better Outcomes


VOLUME 2, NUMBER 1

Optimal Withdrawal Strategy for Retirement-Income Portfolios

1. Introduction

1. Determine Retirement Period
2. Determine Portfolio Equity Allocation
3. Determine Withdrawal Percentage for a Given Target
4. Repeat Annually

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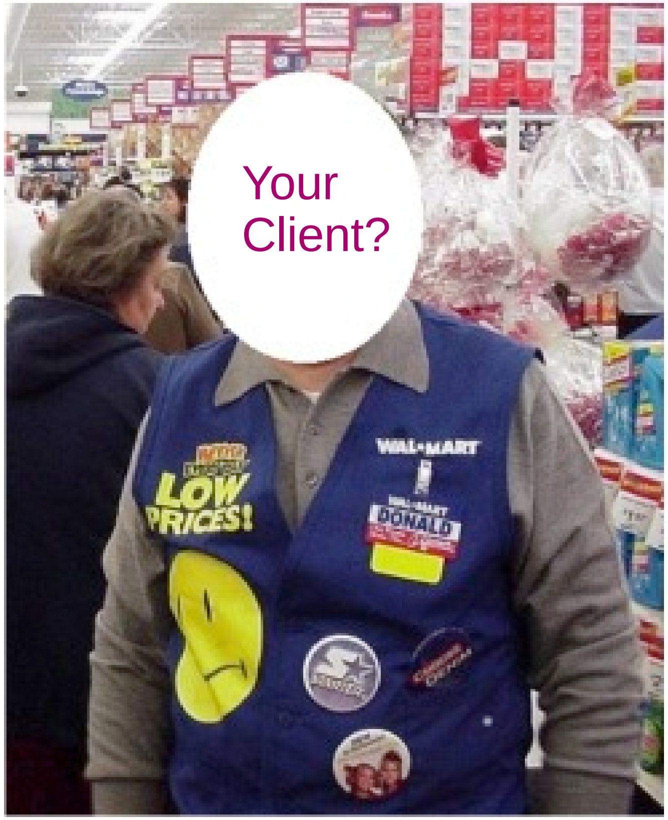
- Annuities

Who Cares About Lifetime Income?



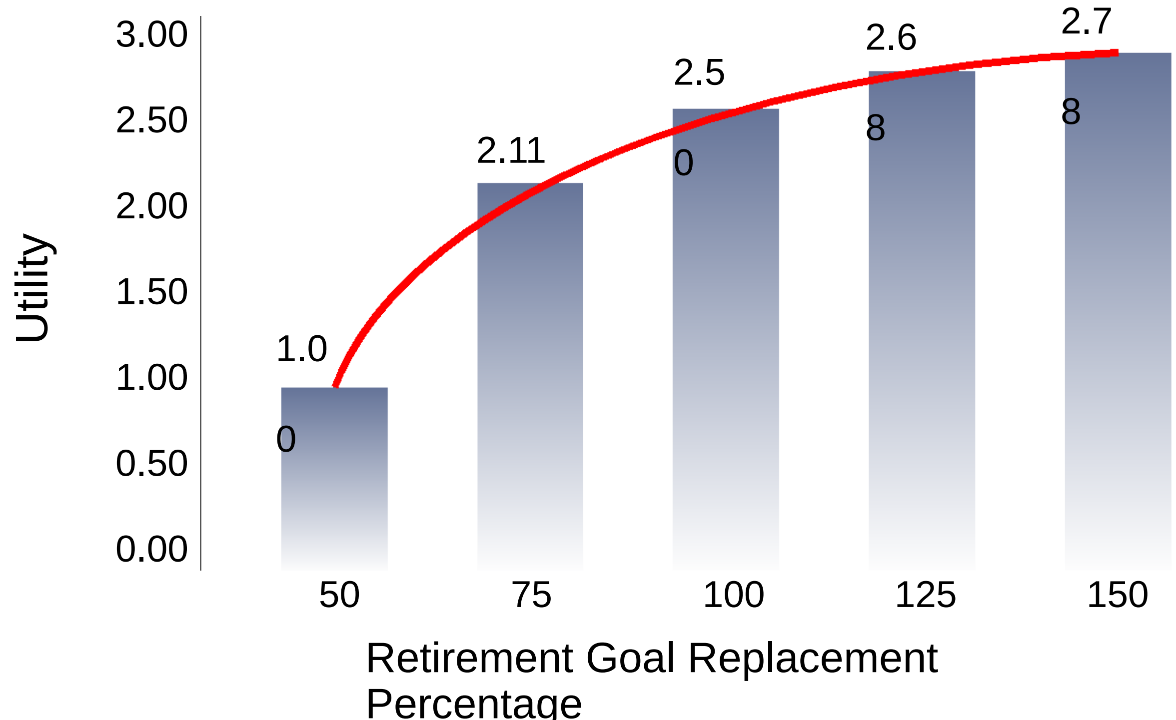
Inefficient Retirement Planning

Defined Benefit Plans

401(k) Plans

Do You Feel Lucky?

Using Utility to Estimate Retiree Preferences



- Goal is to maximize the total income replaced during retirement
- Excess income is good, but a shortfall is penalized more

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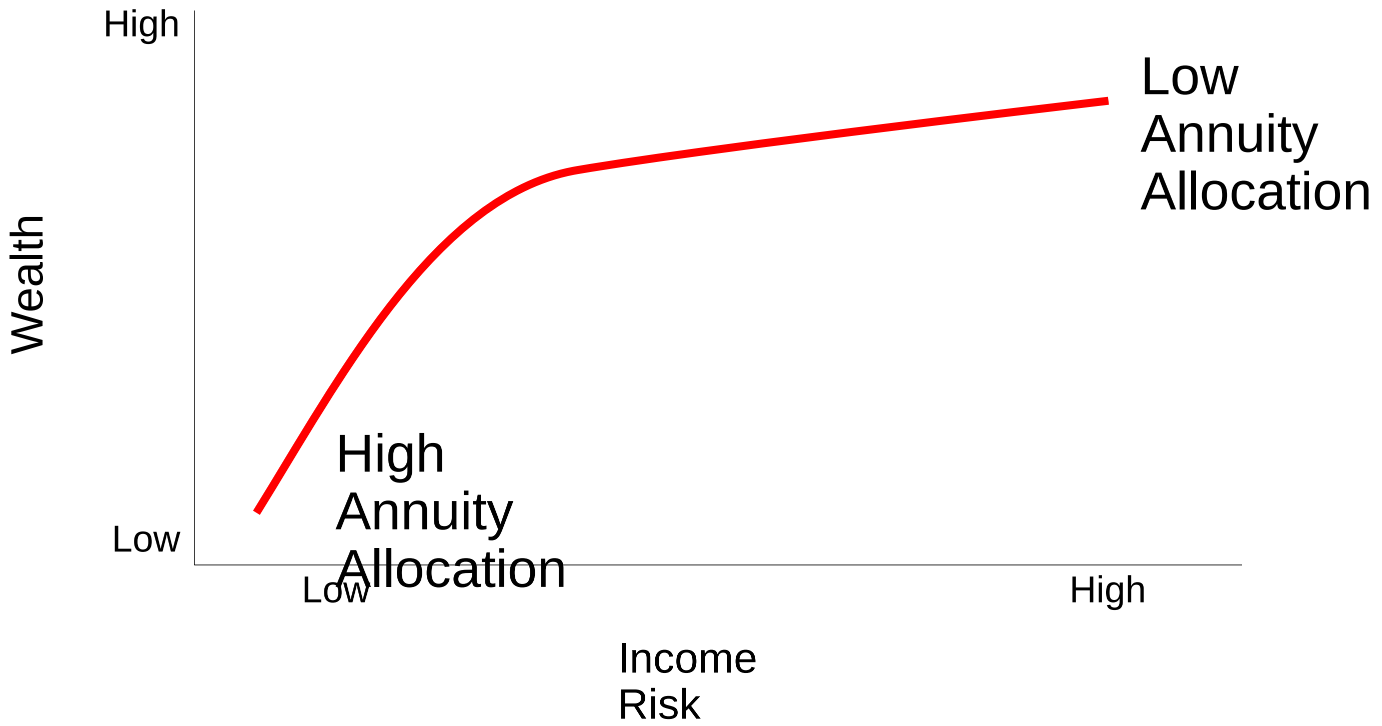
Retirement Income Efficient Frontier



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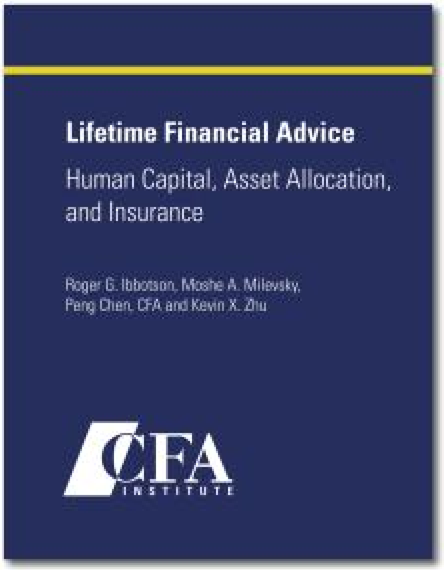
Incorporating Guaranteed Income


Lifetime Financial Advice

Human Capital, Asset Allocation, and Insurance

Roger G. Ibbotson, Moshe A. Milevsky, Peng Chen, CFA and Kevin X. Zhu

CFA INSTITUTE

Research published in CFA Institute Monograph


Human Capital, Asset Allocation, and Life Insurance

Peng Chen, CFA, Roger G. Ibbotson, Moshe A. Milevsky, and Kevin X. Zhu

Award-winning paper on the integration of human capital and asset allocation


Contributions

Allocation to Deferred Variable Annuities with GMWB for Life

Executive Summary

Research paper focused on a methodology reflecting the features of variable annuities with GMWB for life

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Determining Asset Allocation with Annuities

Collect Inputs

Human Capital

Financial Capital and Current Savings

Life Insurance Annuities

Determine Asset Allocations

Traditional Funds, ETF’s

Life Insurance/ Annuities

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- Asset Location and Withdrawal Sourcing

The Importance of Taxes

Analysis assumes a 35% tax rate, where taxed are paid annually in the taxable account, but not until the end of the period in the Traditional IRA

Asset Allocation and Withdrawal Sourcing

Inefficient

Allocating and Withdrawing Stock from IRA First.

Moderate

Allocating Stocks to Taxable Account and Withdrawing From IRA First

Efficient

Allocating and Withdrawing Stocks From Taxable Account

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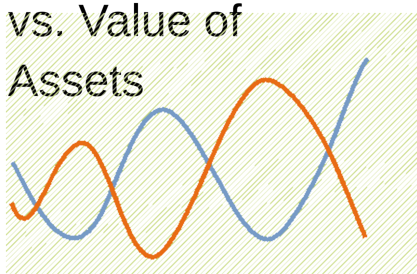
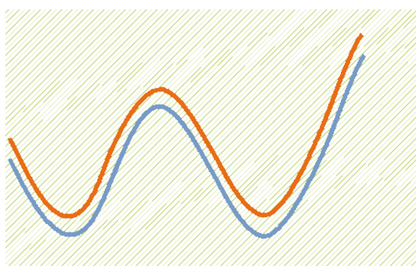
Liability Relative Optimization

What is Portfolio Risk?

What is the TRUE risk for a portfolio that exists to fund (pay for) a liability?

- It is NOT the standard deviation of the asset portfolio
- It is NOT the performance of your asset portfolio relative to the asset portfolios of your peers
- The TRUE risk is that it won't be able to pay for the liability!

Improving Portfolio Health

	Value of Liabilities vs. Value of Assets		Portfolio Health/Funding Costs
Asset-only Approach			
Liability-relative Approach			

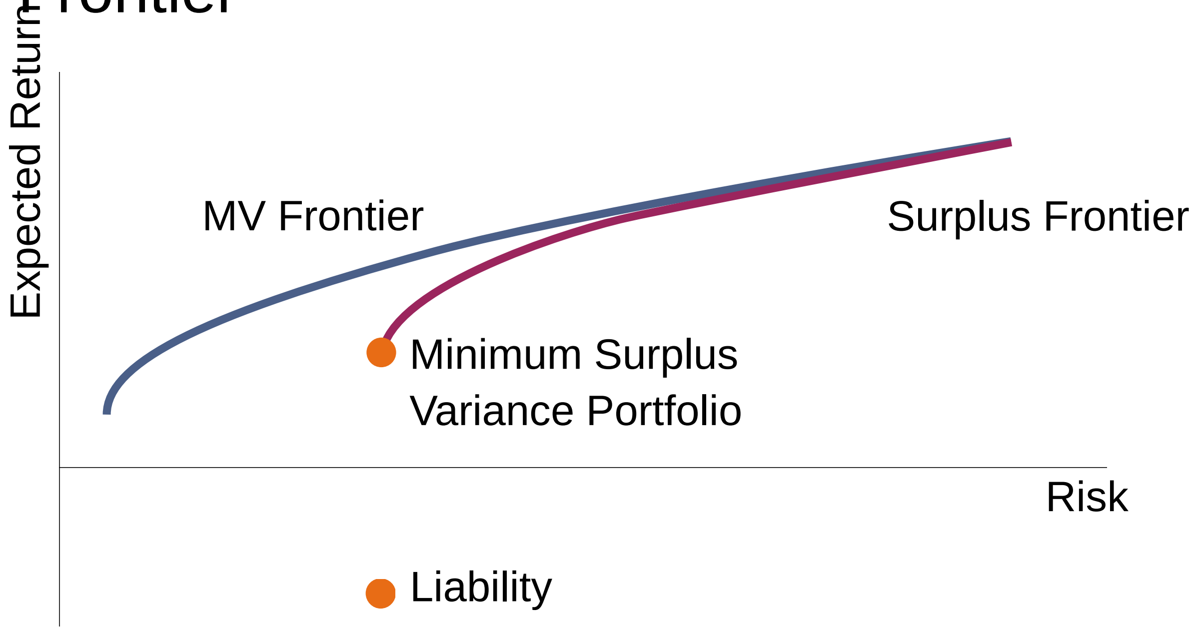
Time

— Value of Assets
— Value of Liabilities
— Portfolio Health

What is Surplus Optimization?

- A special case (or extension) traditional mean-variance optimization in which the optimizer is constrained to hold a combination of assets representing the liability short
- One element of broader approach called liability-relative investing or asset-liability management (ALM), which can include 1) duration matching (a.k.a. immunization), 2) convexity matching, and 3) cash flow matching
- Focuses on the entire portfolio–assets and liabilities–not just the assets of a portfolio

Retirement Income Efficient Frontier



Surplus optimization considers both the amount and investment characteristics
of the liability (funding ratio)

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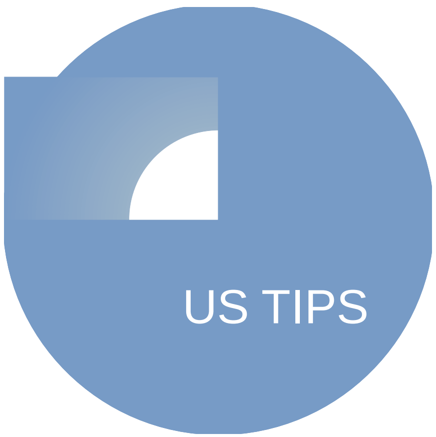
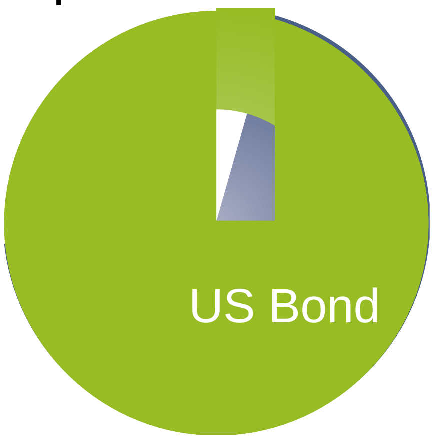
Different Portfolios

Liability Relative Optimization



Asset-Only Optimization



- Cash
- US Bond
- Non US Bond
- US TIPS
- US Large Cap Stock
- US Small Cap Stock
- Non US Large Cap Stock
- Emerging Markets Stock

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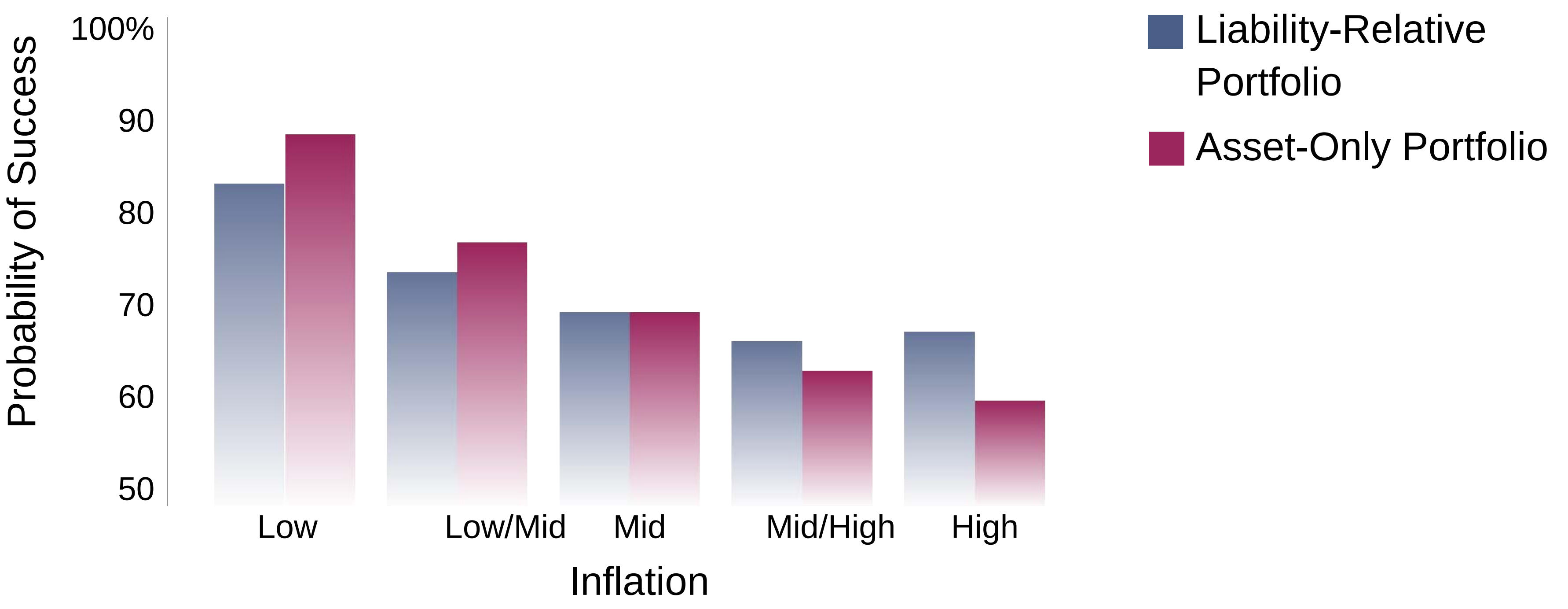
Return and Risk Impact

	Scenario One: Standard		Scenario Two: Surplus	
	Return	Risk	Return	Risk
Liability-Relative Optimization	6.00	7.45	3.74 6.79	
Asset-Only Optimization	6.00	6.71	3.66 7.38	

Source: “Alpha, Beta, and Now… Gamma” by David Blanchett and Paul D. Kaplan, Morningstar White Paper

More Consistent Success Rates



Source: “Alpha, Beta, and Now… Gamma” by David Blanchett and Paul D. Kaplan, Morningstar White Paper

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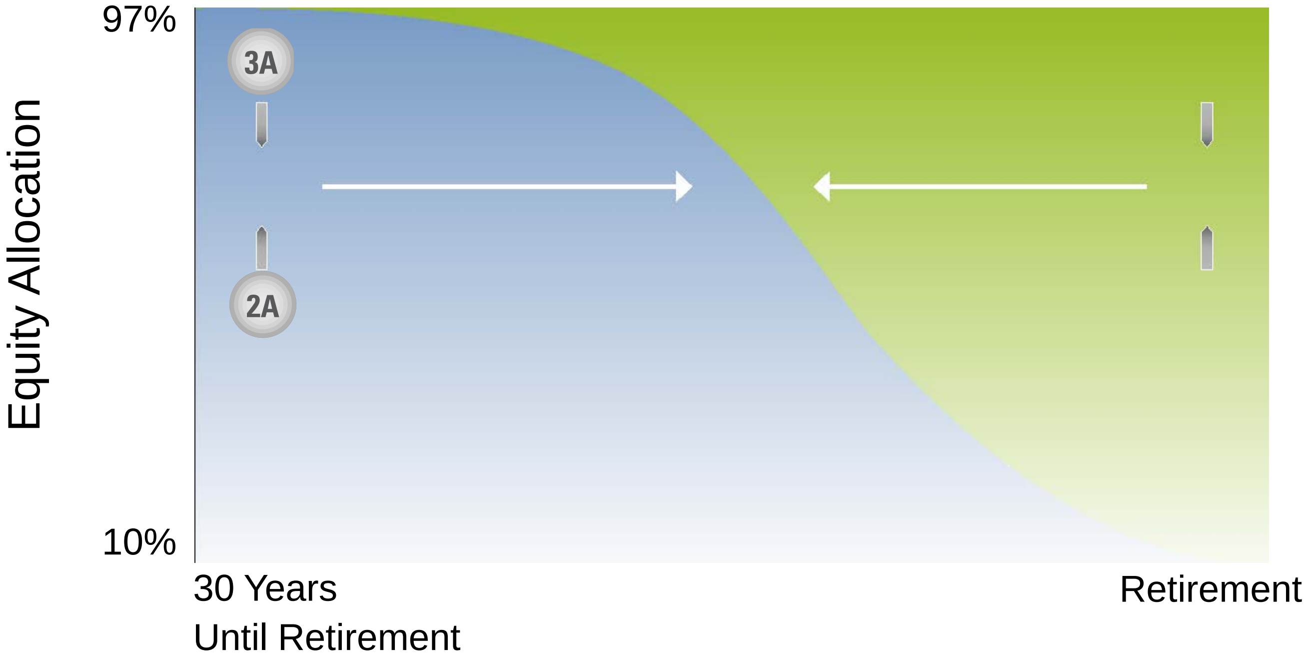
Morningstar's 3x3 Liability-Relative Approach

Over 500 portfolios created for each plan



A Accumulation

D Distribution

CP Client Portfolio

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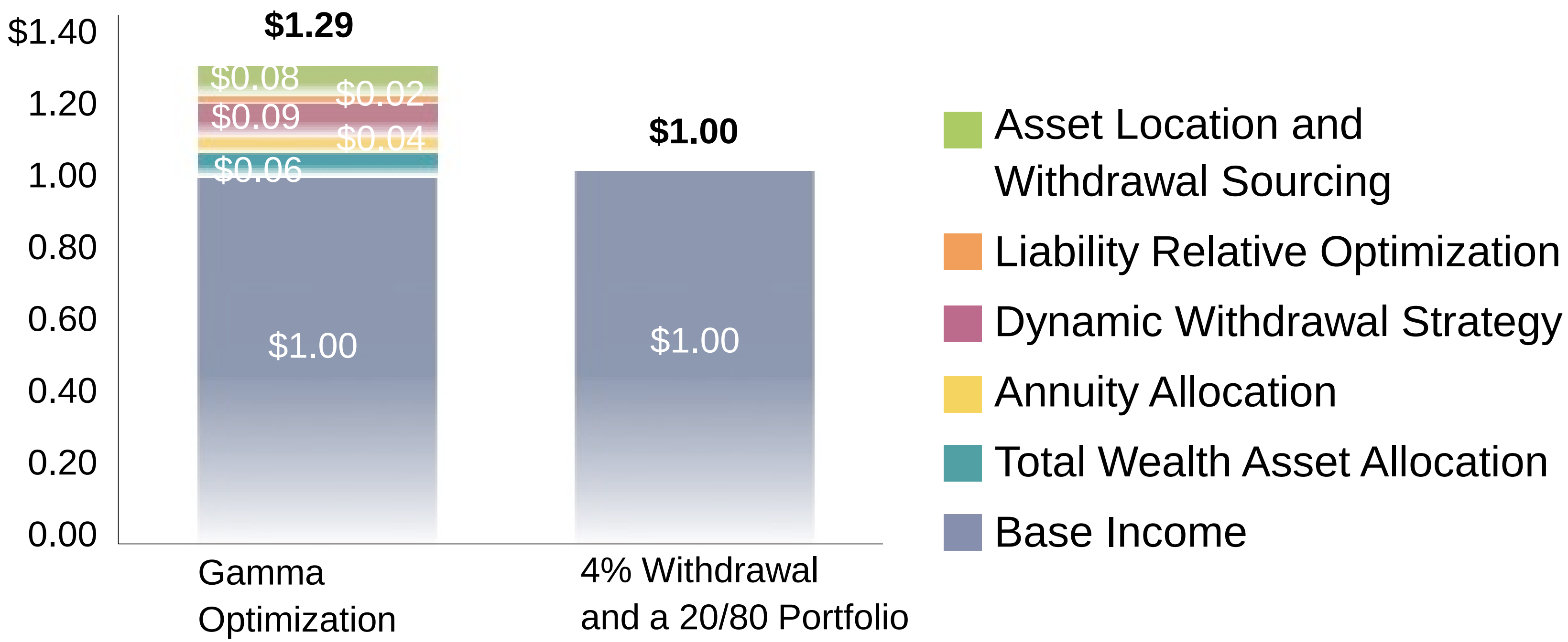
Results

Why Does Gamma Matter?



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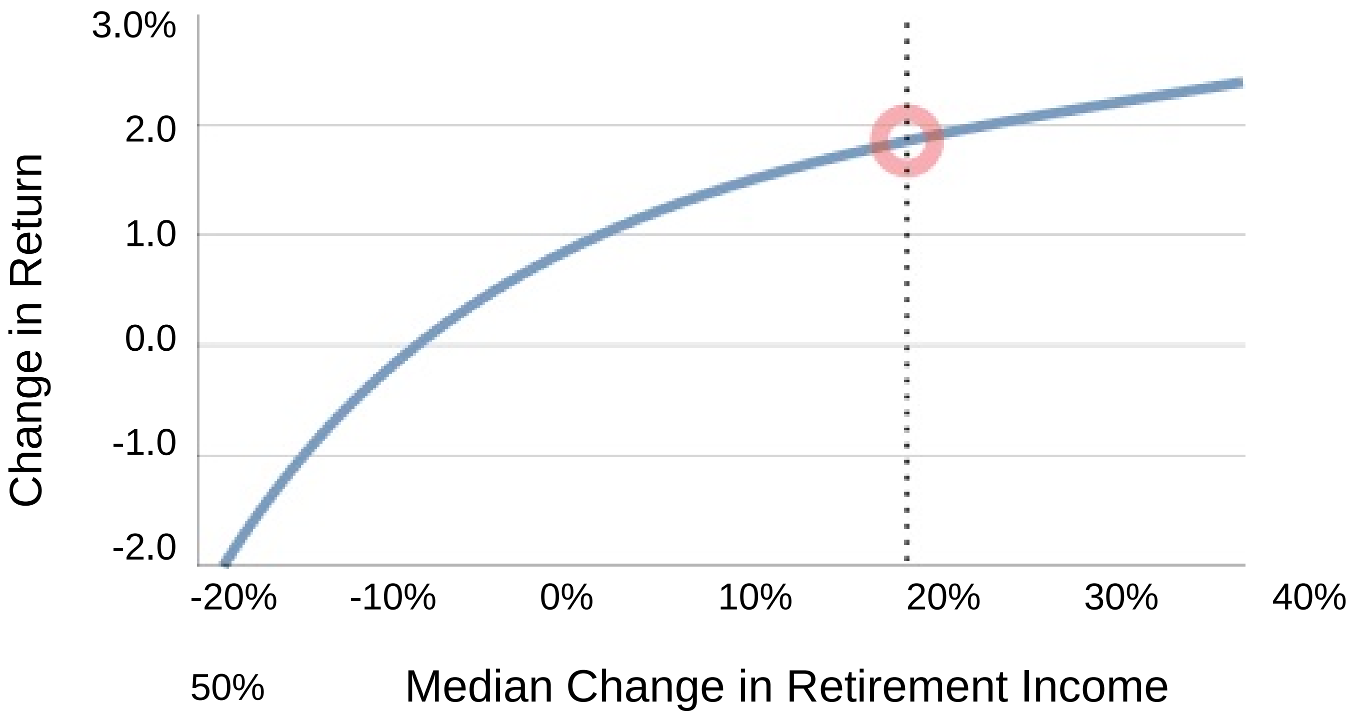
Source: “Alpha, Beta, and Now…Gamma” by David Blanchett and Paul D. Kaplan, Morningstar White Paper

Potentially More Income with Gamma Optimization



+28.8% in retirement income is equivalent to a return increase of +1.82% (i.e.”Gamma equivalent alpha”)

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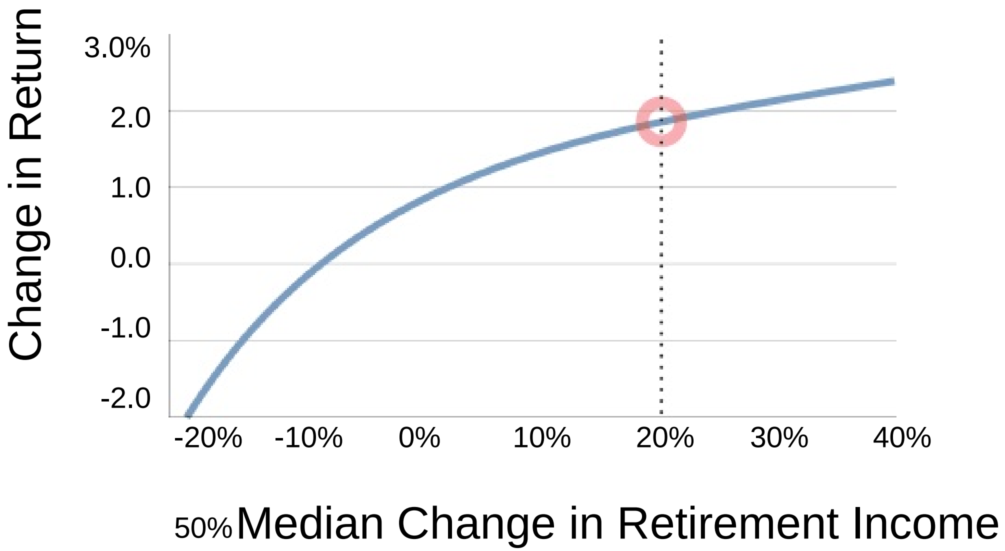
Source: “Alpha, Beta, and Now…Gamma” by David Blanchett and Paul D. Kaplan, Morningstar White Paper

Potentially More Income with Gamma Optimization



Optimal social security benefit claiming can increase income by 9.15%, which creates equivalent alpha" of +74%

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Source: "Alpha, Beta, and Now…Gamma" by David Blanchett and Paul D. Kaplan, Morningstar White Paper

Gamma Conclusions

- Value is more than Alpha and Beta
- Creating retirement income from a portfolio is complicated
- There are a number different risks that need to ne considered when building an “optimal” retirement income portfolio
- An optimized retirement income plan (i.e., Gamma-optimized) can potentially generate 29% more retirement income than a naïve approach based on our initial research and potentially 38% more income for a hypothetical retiree when adding social security
- This creates “Gamma equivalent alpha” of 1.82% or 2.15%, respectively

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Methodolog
y

Calculating Gamma

- Gamma is the utility-adjusted income generated by the Gamma-optimized portfolio, which we donate as *II*
- We define *II* as the constant payment amount that a retiree would accept such that his or her utility would equal the utility of the actual income path realized on a given simulation path
- This is given by

$$II = \left(\frac{\sum_{t=0}^{T} q_t (1+\rho)^{-t} I_t^{\frac{\eta-1}{\eta}}}{\sum_{t=0}^{T} q_t (1+\rho)^{-t}} \right)^{\frac{\eta}{\eta-1}}$$

Calculating Gamma

- There are two preference parameters (ρ and η) that describe how the investor feels about having income to consume at different points in time, with no reference to risk
- Following the approach in Epstein and Zin (1989), we treat the elasticity of substation as a parameter θ distant from the risk tolerance parameter. We introduce the risk tolerance parameter ( ) next by treating the path as unknown and evaluating expected utility

$$EU = \sum_{i=1}^{M} p_i \frac{\theta}{\theta - 1} (\Pi_i)^{\frac{\theta - 1}{\theta}}$$

θ = risk tolerance parameter (.333)
M = number of paths
i = which of M paths is being referred to
p_i = the probability of path i occurring which we set to 1/M.

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Calculating Gamma

- We define *Y* as the constant value for *II* that we yield this level of expected utility. This is given by

$$Y = \left[\sum_{i=1}^{M} p_i \, (II_i)^{\frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1}}$$

- We can now formally define the Gamma of a given strategy or set of decisions as

$$Gamma\ (Strategy) = \frac{Y\ (Strategy) - Y\ (Benchmark)}{Y\ (Benchmark)}$$

Important Disclosures

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